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Hiccup as an uncommon symptom of pneumonia

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Abstract

Hiccup is a symptom resulting with uncontrolled contractions of the diaphragm and external intercostals muscles with inspiration and with simultaneous sudden closure of the glottis, that produces specific “hic” sound. Depending on the time of duration, hiccup can be classified as acute (up to 48h), chronic (48h to 1 month) and persistent (lasting longer than one month). The exact pathophysiology of this symptom still remains unknown, though it is well known, that short-term episodes of hiccup are mainly caused by oesophagus and stomach diseases (gastric and duodenal ulcers, gastritis, gastro-oesophageal reflux) or alcohol consumption.

Other reasons of this phenomenon include the diseases with the stimulation of the vagus nerve or conditions with diaphragm irritation. It can be also psychogenic or resulting from central nervous system diseases.

Short term episodes of hiccup happen to every person and do not cause any concern. Chronic hiccups can lead to significant worsening of quality of life including fatigue, nutritional restrictions, dehydration, weight loss, insomnia, respiratory disorders, depression or even suicidal thoughts.

We present an interesting case with diagnostic and therapeutic procedures in a 65-year-old smoker, who was hospitalized in our Department because of pneumonia, with persistent hiccup as an additional complaint considerably deteriorating his quality of life.

Key words: hiccup, symptom, pneumonia.

Introduction

Hiccup consists of involuntary contractions of the diaphragm and external intercostal muscles with inspiration and almost simultaneous (within 30-40 ms) sudden closure of the true glottis, producing a distinctive "hic" sound [1, 2, 3, 4]. The frequency of hiccup ranges from 2 to 60 times per minute [4, 5, 6]. Hiccup can be classified by the duration as acute (up to 48 hours), chronic (lasting from 48 hours to one month) and persistent treatment refractory that lasts more than 1 month [1, 3, 6, 7]. Chronic hiccup occurs with a frequency of

about 1/100 thousand patients [6]. The exact pathophysiology of this phenomenon is still unknown [1, 3, 4, 6, 7].

We present an interesting case of a patient hospitalized due to pneumonia, with persistent hiccup as an additional complaint significantly deteriorating the quality of life. The study describes diagnostic and therapeutic management in this patient.

Case report

A 65-year-old smoker (20 cigarettes/day), without the history of internal diseases, was admitted to the clinic in the medium-severe general condition due to shortness of breath, cough, fever for several days up to 40ºC and persistent hiccup lasting a few weeks whose frequency had increased in the week before admission to the hospital. The previous episode of severe hiccup occurred 7 years ago, lasted about a week, and was effectively treated on an outpatient basis using metoclopramide. On auscultation, crepitations were heard in the left lower pulmonary field. The chest X-ray, which was performed on an outpatient basis, revealed the presence of parenchymatous densities at the hili and pulmonary emphysema.

The laboratory tests showed significantly increased concentrations of inflammatory parameters (CRP was 138 mg/l with the reference range of 5 mg/l), ferritin considerably above the norm (3278 ng/ml with the reference range of 22 - 322 ng/ml), D-dimers (1638 ng/ml with the reference range of <500 ng/ml), transaminases (AST 107 U/L, ALT 97 U/L). In addition, grade I normocytic anaemia (Hg 12.3 g/dL) was diagnosed at the serum iron concentration of 31.0 μg/dl. Physiological flora was obtained from blood and urine cultures. Cancer marker concentrations (Ca 72-4, Ca 15-3, CEA, CA 125, CA 19-9, AFP, PSA) remained within normal limits.

The CT scan of the lungs showed whitening and confluent densities with a central air bronchogram within the entire lower lobe of the left lung and thickening of the pleura with traces of fluid. Pneumonia of the lower lobe was diagnosed based on the physical examination, radiological and laboratory tests.

Empirical antibiotic therapy used during hospitalization improved the clinical status. For the treatment of hiccup, intravenous chlorpromazine 2 x 25 mg was initially used along with metoclopramide 30 mg daily. Due to the ineffectiveness of this treatment, haloperidol was introduced at a dose of 3 x 20 drops orally. Hiccup completely disappear and did not reoccur after discontinuation of the treatment, which coincided with a decline in the levels of inflammatory parameters and acute phase proteins.

The imaging examinations (computed tomography of the head and magnetic resonance imaging of the brain - MRI) and neurological consultation excluded a neurological cause of hiccup, thus further hospital diagnosis was discontinued. The MRI revealed a few minor periventricular ischemic foci, which, in the neurologist's view, were irrelevant to hiccup. The electroencephalography was recommended to be performed in outpatient setting in case of hiccup recurrence.

The patient was discharged home after a significant improvement in the clinical condition and partial regression of the previously described radiological changes.

Discussion

Short-term episodes of hiccup happen to every person and are not a cause for concern. Hiccup that lasts more than 48 hours can lead to the significant deterioration in the quality of life causing fatigue, restriction in the food intake, dehydration, malnutrition, weight loss, sleep and respiratory disorders, depression, even suicidal thoughts or aspiration pneumonia [1, 4, 6, 8, 9]. It also significantly deteriorates the comfort of living of household members [1, 5].

Hiccup, which is a reflex present from the 8th week of the foetal life, occurs also in prematurely born children [1, 4, 7]. It is considered to be a primitive remnant of the foetal life, during which it is responsible for isovoluminal contractions of the inspiratory muscles [1, 6, 7], thereby conditioning their proper development and subsequent adaptation of the newborn to the extrauterine life. According to other theories, hiccup is protection against aspiration with amniotic fluid or a reaction to stretching of the gastric walls after ingestion of the foetal fluid [4]. After birth, hiccup becomes an unnecessary reflex, but it can be triggered by irritation of the fibres forming the reflex arc [4].

The reflex arch of hiccup is formed by the afferent fibres of the phrenic nerve, the vagus nerve, and the sympathetic dorsal roots of the Th6-Th12 nerves leading impulses to the brainstem and partially to the cerebellum, thalamus and hypothalamus [1, 2], where its main centre [1, 2, 4, 6, 8, 9] is located. The efferent route consists of centrifugal (motor) fibres of the phrenic nerve and connecting fibres through which impulses reach the effectors, such as the diaphragm, muscle closing the glottis and the accessory respiratory muscles [6, 9].

Short-term episodes of hiccup are primarily due to diseases of the oesophagus and stomach (gastric ulcer, duodenal ulcer, gastritis, gastroesophageal reflux) or alcohol consumption [4, 6]. They usually disappear spontaneously and are not a cause for concern.

The causes of hiccup can be divided into the following categories [2, 6, 10]:

- diseases with the stimulation of the vagus nerve (pharyngitis, pneumonia, pleuritis, peptic ulcer, abdominal distension) [1, 7];
- conditions with irritation of the diaphragm (stretching of the gastric wall, abdominal surgery, abdominal hernia, hepatosplenomegaly, subphrenic abscess [1,2,4,7];
- central causes: brain tumours, encephalitis, meningoencephalitis, cerebral infarction, cerebral haemorrhage, multiple sclerosis [1, 2];
- psychogenic hiccup [2,6];
- causes related to organism intoxication: alcohol poisoning, uraemia, metabolic acidosis, electrolyte disorders in renal failure, certain drugs: some antibiotics, antineoplastic agents, benzodiazepines, opioids (morphine), dexamethasone, methohexital, dopamine agonists used to treat Parkinson's disease, inhaled steroids [8, 9, 10];
- causes related to general anaesthesia [7, 10], intubation (mechanical irritation), bronchoscopy or other interventions within the throat.

Some benzodiazepines and antidopaminergic drugs, which are used in the treatment of hiccup, can trigger this condition. Therefore, it is difficult to unambiguously indicate the mechanism that induces hiccup [10].

Chronic hiccup primarily requires the establishment of aetiology and the use of causal therapy [4, 6]. The non-pharmacological treatment includes the Valsalva manoeuvre, drinking a glass of water [7, 10], inhalation of carbon dioxide by respiration into a paper bag or a breath hold for a longer time ($PaCO_2$ increase) [4, 10]; osteopathic manipulative treatment may also be used as well as acupuncture [4, 7, 10].

Drugs used in the treatment of chronic hiccup are antidopaminergic drugs, such as chlorpromazine, prochlorperazine, metoclopramide; the first-line treatment of prolonged hiccup includes baclofen and in the case of its ineffectiveness also gabapentin. Phenytoin, carbamazepine and valproic acid are also recommended for hiccup of the central etiology. If hiccup is caused by gastroesophageal reflux, IPP may be used, e.g. omeprazole [3, 4, 6, 8, 9, 10,]. There are reports on the efficacy of lidocaine and dexamethasone. Haloperidol was the most effective for our patient.

Hiccup occurs in mechanical irritation, inflammation or damage to the nerve fibres creating the hiccup reflex [6, 8, 9]. The afferent pathway of the reflex arc includes nerve fibres that innervate the lungs and pleura (the vagus nerve and sympathetic dorsal roots of the Th6-Th12 nerves). Potentially all pathologies that develop in the lungs, pleura and mediastinum may lead to hiccup [8]. A case of persistent hiccup has been described in a patient with pulmonary embolism [8]. We have found in the available literature a case of

pneumonia complicated by persistent hiccup [11]. According to Burdette and Marinella, the pathophysiology of hiccup in the course of pneumonia is associated with irritation of the fibres of phrenic nerve and its pericardial branch [11]. According to Kwok K. Meng, the presence of hiccup in pneumonia may be due to irritation of the vagus nerve by the inflammatory process within the lungs [1].

In our patient, we did not find other than pneumonia possible causes of chronic hiccup; however, the diagnostic process should always consider serious illnesses as well as the iatrogenic aetiology.

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